

Strength Training for Women

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Every athletic program should emphasize strength training for females just as emphatically as it does for males. Unfortunately, some coaches discourage female athletes from lifting, or the athletes eliminate themselves due to strident misconceptions. Both scenarios are unjustified.

There are many fictitious beliefs surrounding females and strength training. Some of these myths stem from years of hand-me-down misinformation or groundless gender stereotypes. Unfounded fears of losing flexibility, gaining too much bulk, and acquiring masculine features, only aggrandize these invalid assumptions.

These fabrications are due primarily to societal misgivings. The muscle magazine portrayals of female bodybuilders – some being the products of illicit chemical enhancement – only exacerbate the enigma.

Cultural customs that regard strength training as solely a male endeavor are antiquated and absurd. The benefits of strength training are just as profound and important for females as they are for males.

Facts on Females

Scientific studies dating back to the '60's tell us that females can gain strength without the same degree of hypertrophy (muscular size) experienced by males. There are sparse exceptions due to genetic predisposition, but the vast majority of females do not need to worry about developing thick, unfeminine muscles. Actually, several scientific studies indicate that females engaged in strength training will lose body fat with a concurrent increase in muscle size – much like their male counterparts. The result is a trimmer, firmer physique - with either a slight increase in total body weight or no change at all.

However, the degree of muscular hypertrophy is considerably less in females. Several factors account for this: (1) females tend to have lower muscle to body fat ratios when compared to males, (2) females have only about one-tenth of the testosterone (the muscle building male hormone) of males, and (3) from an anatomical standpoint, many females are smaller in stature than males, which means that females carry less overall muscle weight and possess shorter muscle bellies.

Simply put, females inherit less muscle tissue than males, thus hindering their absolute strength when compared to males. In relative terms, a much different story emerges.

Absolute Vs Relative Strength

When comparing the overall strength gains between the genders, it is important to distinguish between absolute and relative values. In absolute terms (i.e., total weight lifted), the average female is about two-thirds as strong as the average male. In relative terms (i.e., based upon identical areas of cross-sectional muscle), strength gain potential is identical between females and males.

Women tend to be weaker than men in the chest, shoulders, and arms. The discrepancy is a consequence of less overall muscle tissue in these areas. Closer scrutiny reveals, however, that the imparity is not as pronounced in the lower body. Interestingly, Wilmore (1974) found females to slightly surpass males in relative leg strength based upon leg press testing.

Coaches must accept the fact that female and male muscle tissue is uniform. This is an important precept, as it indicates that the ability of muscle tissue to gain strength and produce power is independent of gender. Based upon lean body mass, many women are capable of becoming proportionally as strong as many men. This increased strength provides females with a better chance of performing their athletic endeavors at an optimal level, while reducing the likelihood of injury – which is strength training's most prominent selling point.

Special Considerations – The Knee

There has been quite a bit of speculation in both the scientific and popular press concerning the more pronounced pelvic width and inward femur angle, or "Q-angle," in females and its contribution to knee injuries. In addition, it has also been postulated that females have more lax muscles and joints than males. The theory suggests a tendency for hyper-flexibility with a concomitant lack of stability. However, no definitive scientific data are available to validate these suppositions.

Nevertheless, an alarming statistic in recent years is the high incidence of anterior cruciate ligament (ACL) injuries in female athletes. For instance, the Big Ten, PAC Ten, and ACC conferences have presented data indicating that females were eight times more likely to sustain an ACL tear than males in the sport of basketball. Similar data reported in *The American Journal of Sports Medicine* indicates that female soccer players are sustaining ACL injuries at a rate two to five times more frequently than males.

In light of these findings, there is no question that the knee complex deserves special attention when training female athletes. There appears to be some solid scientific evidence that the hamstrings (posterior thigh), abductors (lateral thigh/hip), and adductors (medial thigh/hip) require specific targeting.

Our leg/hip-strengthening program encompasses exercises – both multi-joint and single-joint – which address this concern. Multi-joint movements such as leg presses, squats, deadlifts, and lunges should be staples in the female strength-training regimen. Single-joint exercises should include leg curls, leg extensions, adduction, abduction, hip flexion, hip extension, calf raises, and dorsi-flexion (upward flexion of the front of the foot).

Special attention should be given to leg curls, due to the previously mentioned deficit that females seem to have in this area. This can be consigned with higher rep sets (12-15) on this exercise, or by adhering to a 2:1 ratio of leg curl to leg extension sets.

This comprehensive approach will not only strengthen the muscles and connective tissue of the knee complex itself, but also the proximal and distal compartments that support it.

Running, Jumping, and Landing

Females should also engage in a variety of movement drills performed in the "athletic position." The athletic position necessitates good bend at the ankles, knees, and hips, with a relatively flat back. Sport-specific and/or position-specific agility drills from this position should be enacted on a regular basis. Appropriate cues (visual or verbal) should be included to initiate the applicable sensory and neural responses.

When running, cutting, and stopping, females should be instructed to keep their feet under their hips on contact and take short, choppy steps. These techniques will aid in averting two identified causes of ACL injuries – externally rotated legs and hyperextended knees.

Female athletes who are involved in jumping sports (e.g., basketball, volleyball, hurdling, field events, etc.) must practice good jumping and landing techniques. When jumping, the chest should be aligned over the knees and the knees over the balls of the feet. During landings, the knees should be flexed and in alignment between the first and second toes.

When the legs are adducted (bowed inward) and/or straight upon landing, there is an increased likelihood for knee ligament strain and hyperextension – a common cause of serious connective tissue and meniscus (cartilage) injuries. We teach our athletes to land in a neutral knee position (flexed with knees aligned between the first and second toes) with a toe-to-heel "soft-rocker" foot placement.

Shoulder Considerations

The shoulder area also merits accentuation, as most females have a wider carrying angle from the upper to lower arm (i.e., the lower arm has a more pronounced outward angle than in males). It is believed that this inherent anatomical variable can be instrumental in an increased incidence of shoulder injuries. Although some of these concerns are still speculative, we advise a comprehensive shoulder program that envelops the anterior, posterior, medial, and intrinsic rotator cuff musculature.

This can be accomplished with a variety of forward, lateral, and posterior arm raises, along with internal and external cuff rotations. Seated military and/or incline presses should also be performed, unless they are contraindicated due to joint pain or the residues of past injuries.

Menses Considerations

One other special consideration deserving mention is the onset of menstrual cycle disruptions. Irregular menstrual cycles (oligomenorrhea), or the cessation of menses (amenorrhea), can lead to more serious problems. Amenorrheic athletes are more prone to musculoskeletal injuries (e.g., stress fractures) due to reduced estrogen (female hormone) levels, which weakens bones.

Female athletes must be counseled on these conditions and urged to seek medical advice from their gynecologist should either one surface. It should be noted that there is no significant scientific data indicating that the onset of a normal menstrual period negatively affects training or athletic performance. If an athlete feels any adverse physical effects during her pre-menstrual or menstrual cycles, again, she should seek medical counsel.

Final Rep

At Michigan State, we have found that female athletes are just as dedicated, intense, hard working, and committed to strength training as the males. Our females are coached aggressively in the weight room and they perform the same exercises and routines that we have described in past articles.

Since many females do not come into the program with the same extensive strength training background as the males, we place special emphasis on quality reps and exercise technique in the early stages of their orientation. Once they learn the program specifics, however, they attack it with fervor and discipline. On any given day, you will find our female athletes training along side the male athletes with determination in their eyes and an unrelenting work ethic. Pay attention, guys – you might learn something.

References

Brzycki, M., A Practical Approach to Strength Training, Masters Press, Indianapolis, IN, 1995.

Hutchinson, M., Ireland, M. L., Knee Injuries in Female Athletes, Sports Medicine, 19 (4): 288-302, 1995.

Lambrinides, T., Strength Training and the Female, High Intensity Training Newsletter, Vol. 4, #4, 1993.

Note: For further information on a comprehensive injury prevention program for female athletes, contact the Cincinnati Sportsmedicine and Orthopaedic Center at (513) 559-2818, www.cincinnati-sportsmed.com.